



(12) **United States Patent**
Smith et al.

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(54) **METHODS AND DEVICES TO REDUCE DAMAGING EFFECTS OF CONCUSSIVE OR BLAST FORCES ON A SUBJECT**

(56) **References Cited**

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(21) Appl. No.: **13/489,536**

Ferguson, J., et al., "Cervical Collars: A Potential Risk to the Head-Injured Patient," International Journal of Care fo the Injured, (1993), vol. 24, No. 7, pp. 454-456.

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Related U.S. Application Data

(63) Continuation-in-part of application No. 12/931,415, filed on Feb. 1, 2011, now Pat. No. 9,168,045, which
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(57) **ABSTRACT**

(51) **Int. Cl.**
A61B 17/00 (2006.01)
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A method and device for reducing the damaging effects of a blast or concussive event includes applying pressure to at least one jugular vein to reduce the egress of blood from the cranial cavity during the incidence of the concussive event. Reducing blood out flow from the cranial cavity increases intracranial pressure of the cerebrospinal fluid to reduce the risk of traumatic brain injury and injuries to the spinal column. Reducing blood out flow further increases the intracranial pressure, and thereby increases the pressure of the cochlear fluid, the vitreous humor and the cerebrospinal fluid to thereby reduce the risk of injury to the inner ear, internal structure of the eye and of the spinal column. In addition, increasing intracranial pressure reduces the likelihood of brain injury and any associated loss of olfactory function.

(52) **U.S. Cl.**
CPC **A61B 17/1325** (2013.01); **A61B 17/135** (2013.01); **A61B 90/08** (2016.02);
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(58) **Field of Classification Search**
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8 Claims, 5 Drawing Sheets

